Sample manager troubleshooting

Power LED

The power LED, on the left side of the sample manager's front panel, indicates when the instrument is powered-on or powered-off.

Run LED

The run LED, to the right of the power LED, indicates the run status.

Sample manager run LED indications:

LED mode and color	Description
Unlit	Indicates the sample manager is currently idle.
Steady green	Indicates the sample manager is operating normally, attempting to complete any outstanding samples or diagnostic requests. When sample and diagnostic requests are finished, the LED returns to the unlit state.
Flashing green	Indicates the system is waiting for an instrument to reach operational condition as when the column manager is reaching its set point.

Sample manager run LED indications: (Continued)

LED mode and color	Description
Flashing red	Indicates a serious error that prevents further operation. Information about the error can be found in the console.
Steady red	Indicates a serious failure within the sample manager that prevents further operation.

Sample manager troubleshooting:

Symptom	Possible cause	Corrective action
Both LEDs unlit	No power	1. Inspect line cord connections. 2. Test electrical outlet for power.
	Open (spent) or defective fuse	Replace fuse.

Sample manager troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Sample compartment freezes.	Sample compartment temperature too cold.	Defrost sample manager, then choose a sample compartment temperature 8 °C (46.4 °F) or greater.
	Sample compartment door opened too frequently.	Minimize sample door access.

Alarm messages

The following table lists the sample manager alarm messages and their resolutions.

To clear alarm messages:

1. Follow the corrective action in this table, and reset the sample manager via the control panel or console.

2. If the alarm message still appears on the console after you reset the sample manager, reboot the sample manager. If the alarm message persists, contact Waters Technical Service.

Sample manager alarm messages:

Message	Resolution
Air sensor calibration h/w fault	Possible cause: Air in system. Resolution: 1. Prime sample manager. 2. Characterize needle and sample loop volumes.
	Possible cause: Damaged volume detection device tube. Resolution: 1. Inspect volume detection device tube for damage 2. Replace if necessary.
	Possible cause: Damaged volume detection device electrical line. Resolution: 1. Inspect volume detection device cable for damage 2. Replace if necessary.

Sample manager alarm messages: (Continued)

Message	Resolution
Air sensor calibration out of range (value)	Call Waters Technical Service.
Air sensor volume not calibrated	Call Waters Technical Service.
Ambient temperature range error (value)	Set room temperature to operational temperature range.
Battery backed file system reset (value)	Call Waters Technical Service.
Battery backed memory h/w failure	Call Waters Technical Service.
Column heater over temperature or h/w fault (value)	Call Waters Technical Service.
Column heater/cooler over temperature or h/w fault (value)	Call Waters Technical Service.
Column temperature range error (value)	Set temperature to within method parameters.

Sample manager alarm messages: (Continued)

Message	Resolution
Column temperature sensor h/w fault (value)	Call Waters Technical Service.
Diagnostic test interrupted by user	Displayed for information only. No action is required.
Drawing sample rate excessive (value)	Set lower draw rate.
eCord connected	Displayed for information only. No action is required.
eCord data invalid	Replace the eCord.
eCord disconnected	Displayed for information only. No action is required.
eCord driver h/w fault	Call Waters Technical Service.
eCord h/w fault	Ensure the eCord fob is attached to the receptacle on the side of the column manager.
eCord not present	Attach the eCord fob to the receptacle on the side of the column manager.
eCord sw fault	Call Waters Technical Service.

Sample manager alarm messages: (Continued)

Message	Resolution
Failed to calibrate system volume	Possible cause: Air in system. Resolution: 1. Prime sample manager. 2. Characterize needle and sample loop volumes.
	Possible cause: Damaged volume detection device tube. Resolution: 1. Inspect volume detection device tube for damage 2. Replace if necessary.
Fuse h/w fault	Call Waters Technical Service.
General failure	Call Waters Technical Service.
Home and/or plate sensors h/w fault	Call Waters Technical Service.
Home and/or reference sensors h/w fault	Call Waters Technical Service.
Injection count exceeded (value)	Displayed for information only. No action is required.

Sample manager alarm messages: (Continued)

Message	Resolution
Injection valve home h/w fault	Call Waters Technical Service.
Injection valve move h/w fault	Inspect the injection valve pod and ensure it is securely fastened to the valve drive.

Sample manager alarm messages: (Continued)

Message	Resolution
Loop calibration out of range (value)	Possible cause: Air in system. Resolution: 1. Prime the sample manager. 2. Characterize needle and sample loop volumes.
	Possible cause: Clogged or kinked needle, injector valve, or loop. Resolution: 1. Inspect needle and loop for damage. 2. Replace if necessary.
	Possible cause: Damaged volume detection device tube. Resolution: 1. Inspect volume detection device tube for damage. 2. Replace if necessary.
	Possible cause: Incorrect loop configuration. Resolution: Change loop configuration on the console.

Sample manager alarm messages: (Continued)

Message	Resolution
Loop volume not calibrated	Possible cause: Change in configuration and loop not characterized. Resolution: Characterize needle and sample loop volumes.
Missing/wrong plate or vial	Check if correct plate is selected and if ANSI version of plate is selected.
Modified SN	Displayed for information only. No action is required.

Sample manager alarm messages: (Continued)

Message	Resolution
Needle calibration out of range (value)	Possible cause: Air in system. Resolution: 1. Prime the sample manager. 2. Characterize needle and sample loop volumes.
	Possible cause: Clogged or damaged needle, injector valve, or loop. Resolution: 1. Inspect needle and loop for damage. 2. Replace if necessary.
	Possible cause: Damaged volume detection device tube. Resolution: 1. Inspect volume detection device tube for damage. 2. Replace if necessary.
	Possible cause: Incorrect needle configuration. Resolution: Change needle configuration on the console.

Sample manager alarm messages: (Continued)

Message	Resolution
Needle volume not calibrated	Characterize needle and sample loop volumes.
Plate present, no plate expected	Remove plate from instrument.
Power supply fan h/w fault	Call Waters Technical Service.
Power supply h/w fault (value)	Call Waters Technical Service.
Sample fluidics high pressure limit (value)	Possible Cause: Clogged fluid line (volume detection device, sample loop, needle, internal valve passages). Resolution: 1. Check for kinked or crushed tubing (volume detection device, sample loop, and needle). 2. Replace damaged tubing.
Sample heater/cooler over temperature or h/w fault (value)	Call Waters Technical Service.

Sample manager alarm messages: (Continued)

Message	Resolution
Sample Manager door closed during defrost	Open sample manager door.
Sample Organizer door closed during defrost	Open sample organizer door.
Sample Organizer temperature range error (value)	Set temperature to within method parameters.

Sample manager alarm messages: (Continued)

Message	Resolution
Sample pressure low (value): possibly no wash solvent or needle damaged	Possible Cause: Wash solvents low or empty. Resolution: Refresh wash solvents and prime the sample manager.
	Possible Cause: Damaged needle. Resolution: Run “Change Needle” diagnostic and inspect needle for damage. Replace if damaged.
	Possible Cause: Loose plumbing connection or leaking injection seal. Resolution: Verify fittings and ferrules are tight and replace if necessary.
	Possible Cause: Pressure regulator out of range (low). Resolution: Call Waters Technical Service.

Sample manager alarm messages: (Continued)

Message	Resolution
Sample pressure sensor h/w fault (value)	Possible Cause: No power to transducer; loose electrical connection. Resolution: Inspect transducer cable and ensure it is properly secured in fluidics interface board.
	Possible Cause: Zero float out of range. Resolution: Call Waters Technical Service.
Sample syringe h/w lost steps (value)	Call Waters Technical Service.
Sample syringe home h/w fault	Call Waters Technical Service.
Sample syringe move h/w fault	Call Waters Technical Service.
Sample syringe move to sensor h/w fault	Call Waters Technical Service.
Sample temperature range error (value)	Set temperature inside method parameters.
Sample temperature sensor h/w fault (value)	Call Waters Technical Service.

Sample manager alarm messages: (Continued)

Message	Resolution
Sample valve home h/w fault	Call Waters Technical Service.
Sample valve move h/w fault	Call Waters Technical Service.
Temperature controller watchdog time-out	Call Waters Technical Service.
Trap valve h/w communi-cation fault	Call Waters Technical Service.
Trap valve h/w fault	Call Waters Technical Service.
Trap valve not installed	Install trap valve.
Wash syringe h/w lost steps (value)	Call Waters Technical Service.
Wash syringe home h/w fault	Call Waters Technical Service.
Wash syringe move h/w fault	Call Waters Technical Service.
Wash syringe move to sensor h/w fault	Call Waters Technical Service.

Sample manager alarm messages: (Continued)

Message	Resolution
X & Y axes not calibrated	Calibrate the XYZ mechanism.
X-axis h/w lost steps (value)	Call Waters Technical Service.
X-axis home h/w fault	Call Waters Technical Service.
X-axis move h/w fault	Call Waters Technical Service.
Y-axis h/w lost steps (value)	Call Waters Technical Service.
Y-axis home h/w fault	Call Waters Technical Service.
Y-axis move h/w fault	Call Waters Technical Service.
Z-axis h/w lost steps (value)	Insert correct plate. Ensure plate is inserted correctly.
Z-axis home h/w fault	Call Waters Technical Service.
Z-axis move h/w fault	Call Waters Technical Service.
Z-axis not calibrated	Calibrate the XYZ mechanism.
Zp-axis h/w needle lost steps (value)	Insert correct plate. Ensure plate is inserted correctly.
Zp-axis home h/w fault	Call Waters Technical Service.

Sample manager alarm messages: (Continued)

Message	Resolution
Zp-axis move h/w fault	Call Waters Technical Service.

Displaying the sample manager's rear panel interface connections

You can use the console to determine the status of input/output signal connections on the rear panel of the sample manager. The console display gives a real-time status of the instrument's signal connections. A green LED indicates a signal cable is connected to the terminal. A red LED indicates no signal cable is connected to the terminal.

To display rear panel interface connections:

1. In the console, select Sample Manager from the system tree.
2. In the sample manager information window, click Troubleshoot > Rear Panel. The Sample Manager Rear Panel dialog box appears.

Sample Manager Rear Panel dialog box:

The following table describes the sample manager I/O connections.

Analog-out/event-in connections:

Signal connections	Description
Inject Start (Out)	Indicates that an injection has started.
Auxiliary (In)	Reserved for future use.
Inject Hold (In)	Input signals from other system instruments to delay the injection.
0–2V Analog 2 (Out)	Chart output functionality.
Switch 1 (Out)	Allows control of third-party instruments.
Switch 2 (Out)	Allows control of third-party instruments.
Switch 3 (Out)	Allows control of third-party instruments.
Switch 4 (Out)	Allows control of third-party instruments.
Run Stopped (Out)	Indicates that the sample manager stopped operation because of an error condition or an operator request (clicking Stop Flow button, for example).

Changing rear panel interface connections

Via the rear panel display, you can open and close certain output connections. Opening or closing output connections can be useful when you need to start or stop an injection or troubleshoot system connectivity.

To change sample manager rear panel interface connections:

1. In the console, select Sample Manager from the system tree.
2. In the sample manager information window, click Troubleshoot > Rear Panel.
3. In the Sample Manager Rear Panel dialog box, locate a signal connection with an Out label, and then click the red or green LED. The output signal for the selected signal connection is either opened or closed .

Sample organizer troubleshooting

Power LED

The power LED, on the left side of the sample organizer's front panel, indicates when the instrument is powered-on or powered-off.

Run LED

The run LED, to the right of the power LED, indicates the run status.

Sample organizer run LED indications:

LED mode and color	Description
Unlit	Indicates the sample organizer is currently idle.
Steady green	Indicates the sample organizer is operating normally, attempting to complete any outstanding samples or diagnostic requests. When sample and diagnostic requests are finished, the LED returns to the unlit state.
Flashing green	Indicates the system is waiting for an instrument to reach operational condition.

Sample organizer run LED indications: (Continued)

LED mode and color	Description
Flashing red	Indicates a serious error that prevents further operation. Information about the error can be found in the console.
Steady red	Indicates a serious failure within the sample organizer that prevents further operation.

Sample organizer troubleshooting:

Symptom	Possible cause	Corrective action
Both LEDs unlit	No power	1. Inspect line cord connections. 2. Test electrical outlet for power.
	Open (spent) or defective fuse	Replace fuse.

Sample organizer troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Fans do not run	Sample organizer not powered-on	Power on sample organizer.
	Fan wiring or fan motor problem	Call Waters Technical Service.
	Power supply not working	Call Waters Technical Service.
Sample plates jam	Plate latch is bent	Remove plate latch from plate, straighten it, and then reinstall it. If problem persists, call Waters Technical Service.
Startup diagnostics failure	Internal problem with controller board, solvent management system, or sample management system	Power-off and power-on again. If failure persists, call Waters Technical Service.

Alarm messages

The following table lists the sample organizer alarm messages and their resolutions.

To clear alarm messages:

1. Follow the corrective action in this table, and reset the solvent organizer via the control panel or console.
2. If the alarm message still appears on the console after you reset the sample organizer, reboot the sample organizer. If the alarm message persists, contact Waters Technical Service.

Sample organizer alarm messages:

Message	Resolution
Organizer communica-tions failure	Check external cable connections.
Organizer configuration modified	Reconfigure the shelves through the console.
Organizer failure	Call Waters Technical Service.
Organizer not present	Check external cable connections.

Sample organizer alarm messages: (Continued)

Message	Resolution
Organizer plate does not exist	Ensure sample plate is in the organizer.
Organizer processes interrupted	Restart the process that was interrupted.
Sample Organizer temperature range error (value)	Call Waters Technical Service.

TUV detector troubleshooting

Power LED

The power LED, on the left side of the detector's front panel, indicates when the instrument is powered-on or powered-off.

Lamp LED

The lamp LED, to the right of the power LED, indicates the lamp status.

TUV detector lamp LED indications:

LED state	Description
Unlit	Indicates the detector is currently idle.
Steady green color	Indicates the detector is operating normally.
Flashing green color	Indicates the detector is initializing or calibrating.
Steady red color	Indicates a serious error that prevents further operation. Information about the error can be found in the console.

TUV detector lamp LED indications: (Continued)

LED state	Description
Flashing red color	Indicates a serious failure within the detector that prevents further operation.

Clearing bubbles from the flow cell

To clear bubbles from the flow cell:

1. Ensure the pressure regulator at the outlet of the flow cell is in place. If the pressure regulator has been bypassed, ensure that a device that develops a minimum of 17 bar (250 psi), but not greater than 69 bar (1000 psi), for the given flow rate and mobile phase is placed downstream from the detector.
2. Establish liquid flow through the detector flow cell with degassed acetonitrile or methanol at a flow rate that is anticipated to be used for subsequent analysis.

TUV detector troubleshooting

Symptom	Possible cause	Corrective action
Analog output incorrect	AUFS setting changed	Reset the AUFS setting.

TUV detector troubleshooting (Continued)

Symptom	Possible cause	Corrective action
Both LEDs unlit	No power	1. Inspect line cord connections. 2. Test electrical outlet for power.
	Open or defective fuse	Replace fuse.
Calibration or energy error on startup	No solvent flowing through flow cell UV absorber in flow cell	Make sure that solvent is flowing through the flow cell. Ensure the mobile phase is transparent (methanol or water). Flush the flow cell. Perform manual calibration.
Communication problems	Configuration problem	Check Ethernet configuration.
	Bad cable	Replace the cable.

TUV detector troubleshooting (Continued)

Symptom	Possible cause	Corrective action
Deuterium lamp does not light; lamp LED is “off”, solid red, or blinking red or green	Faulty lamp	Replace the lamp.
	Lamp not plugged in	Plug in the lamp connector.
	Bad lamp power supply board	Contact Waters Technical Service.
	Lamp switch in “off” position	Inspect the rear panel connections or look for a timed event within a method (possibly programmed to extinguish the lamp).
In dual wavelength mode, time scale is incorrect	Data rate on controller > 2 point/sec	Use a data sampling rate of 1 or 2 point/sec.

TUV detector troubleshooting (Continued)

Symptom	Possible cause	Corrective action
No sample and reference energy; lamp LED is off, solid red, or blinking red or green	Lamp burned out	Attempt to reignite the lamp. If it fails to ignite, replace the lamp.
	Lamp off	Ensure the lamp switch is in the “on” position. Run the Sample and Reference Energy diagnostic.
Peak out of range error at start up	Mobile phase absorbance too high; or air bubbles in the flow cell	Ensure the mobile phase in the flow cell does not absorb above 250 nm. Ensure no air bubbles are in the flow cell. Recalibrate the detector.

Alarm messages

The following table lists the TUV detector alarm messages and their resolutions.

To clear alarm messages:

1. Follow the corrective action in this table, and reset the detector via the control panel or console.
2. If the alarm message still appears on the console after you reset the detector, reboot the detector. If the alarm message persists, contact Waters Technical Service.

TUV detector alarm messages:

Message	Resolution
Calibration differs x.xx 257 nm. Flowcell bubbles possible. Try Calibrate	Recalibrate the detector.
Calibration differs x.xx 379 nm. Flowcell bubbles possible. Try Calibrate	Recalibrate the detector.

TUV detector alarm messages: (Continued)

Message	Resolution
Calibration differs x.xx 521 nm. Flowcell bubbles possible. Try Calibrate	Recalibrate the detector.
Calibration not found. Defaults Set	Call Waters Technical Service.
Calibration successful. Max nm deviation since last calibration: x.xx	Displayed for information only. No action is required.
Calibration unsuccessful. 257 Peak out of range. Flowcell Bubbles?	Flush flow cell.
Calibration unsuccessful. 379 Peak out of range. Flowcell Bubbles?	Flush flow cell.
Calibration unsuccessful. 521 Peak out of range. Flowcell Bubbles?	Flush flow cell.
Communication failure. Reference or Sample A/D.	Call Waters Technical Service.

TUV detector alarm messages: (Continued)

Message	Resolution
Configuration not found. Defaults Set	Call Waters Technical Service.
Dark current. Reference Dark too high	Close detector door.
Filter initialization failure. Erbium position	Clear bubbles from flow cell.
Filter initialization failure. No filters found	Clear bubbles from flow cell.
Filter initialization failure. No reference energy	Clear bubbles from flow cell.
Filter initialization failure. Order filter position	Clear bubbles from flow cell.
Filter initialization failure. Shutter position	Clear bubbles from flow cell.

TUV detector alarm messages: (Continued)

Message	Resolution
Grating initialization failure. Backlash too high. Flowcell Bubbles? Try Cal.	Clear bubbles from flow cell.
Grating initialization failure. Missing/Bad Sensor	Call Waters Technical Service.
Lamp data not found. Life-Time Defaults Set	Call Waters Technical Service.
Lamp data not found. Life-Time Defaults Set	Call Waters Technical Service.
Lamp energy low.	Replace lamp.
Lamp external input conflict	Set the input on the rear panel so that it does not conflict with the lamp command.
Lamp failure	Replace lamp.
Lamp lighting failure	Replace lamp.
Light Level Error. Air in Cell? Try to Calibrate	Flush flow cell.

TUV detector alarm messages: (Continued)

Message	Resolution
Light Level Error. Ref. Saturated. Cycle Power	Flush flow cell.
Lowered gain to avoid saturation. Ref. Light Level Increased	Calibrate the detector.
Lowered gain to avoid saturation. Sample Light Level Increased	Displayed for information only. Indicates that flow cell bubbles were cleared. No action is required.
Method not found. Defaults Set	Call Waters Technical Service.
Mux ADC Calibration command failure	Call Waters Technical Service.
Mux ADC default register error	Call Waters Technical Service.
Mux ADC input selection failure	Call Waters Technical Service.
Mux ADC reset command failure	Call Waters Technical Service.

TUV detector alarm messages: (Continued)

Message	Resolution
No interrupt from preAmp board. Average Samples	Call Waters Technical Service.
No interrupt from preAmp board. Lock. Cannot Continue	Call Waters Technical Service.
No interrupt from preAmp board. Waiting for Data in Dual	Call Waters Technical Service.
Peak not found D2 656 nm. Flowcell Bubbles? Try Calibrate	Flush flow cell and/or replace lamp.
Peak not found xxx.x. Erbium 257 nm. Flowcell Bubbles? Try Calibrate	Flush flow cell.
Peak not found xxx.x. Erbium 379 nm. Flowcell Bubbles? Try Calibrate	Flush flow cell.

TUV detector alarm messages: (Continued)

Message	Resolution
Peak not found xxx.x. Erbium 521 nm. Flowcell Bubbles? Try Calibrate	Flush flow cell.
Remote command receive while calibrating -- Wait for calibration to complete	Displayed for information only. No action is required.
Scan not found. Defaults Set	Call Waters Technical Service.
System cannot respond	Call Waters Technical Service.
System not calibrated. Try to Calibrate	Recalibrate the detector.
This is not an ACQUITY TUV personality card	Call Waters Technical Service.
Wavelengths span 370nm. Order Filter not in use for nm: XXX	Displayed for information only. No action is required.

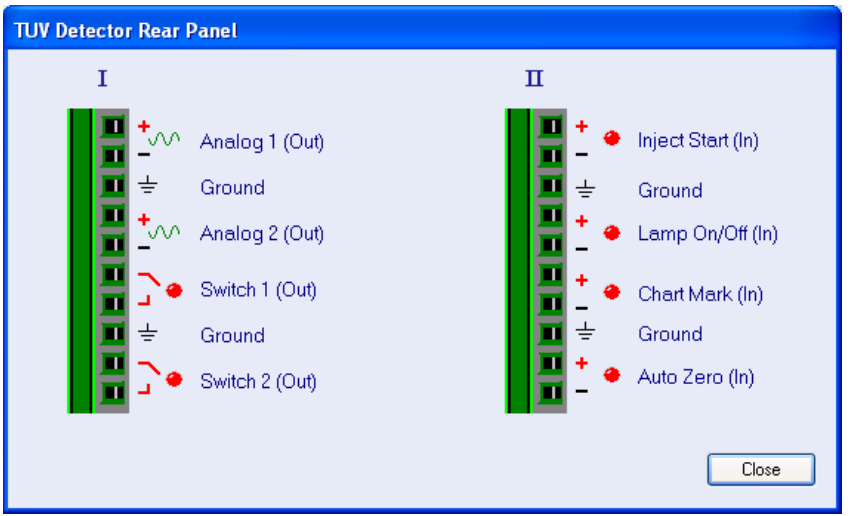
Displaying TUV detector rear panel interface connections

You can use the console to determine the status of input/output signal connections on the rear panel of the TUV detector. This display gives you a real-time status of the instrument's signal connections. A green LED indicates a signal cable is connected to the terminal. A red LED indicates no signal cable is connected to the terminal.

To display TUV detector rear panel interface connections:

1. In the console, select TUV Detector from the system tree.
2. Click Troubleshoot > Rear Panel. The TUV Detector Rear Panel dialog box appears.

TUV Detector Rear Panel dialog box:



The following table describes the TUV detector I/O connections.

TUV detector analog-out/event-in connections:

Signal connections	Description
Analog 1 (Out)	Used for analog chart output functionality.

TUV detector analog-out/event-in connections: (Continued)

Signal connections	Description
Analog 2 (Out)	Used for analog chart output functionality.
Switch 1 (Out)	Controlled by threshold and timed events.
Switch 2 (Out)	Controlled by threshold and timed events.
Inject Start (In)[a]	Activates timed events by triggering the run-time clock to start.
Lamp On/Off (In)[a]	Enables and disables the lamp. When the input is active, the lamp is “on”.
Chart Mark (In)	Adds a chart mark (at 10% of full scale) to either or both analog output channels (Analog Out 1 and Analog Out 2) and is configurable.
Auto Zero (In)[a]	Calculates an offset value that, when added to the sample signal, makes the resulting baseline signal zero.

a. To configure an inject start, chart mark, auto zero, and lamp input, set the appropriate parameter to High.

Changing the rear panel interface connections

Via the rear panel display, you can open and close certain output connections. Opening or closing output connections can be useful when you need to start or stop an injection or troubleshoot system connectivity.

To change TUV detector rear panel interface connections:

1. In the console, select TUV Detector from the system tree.
2. In the TUV detector information window, click Troubleshoot > Rear Panel.
3. In the TUV Detector Rear Panel dialog box, locate a signal connection with an Out label, and then click the red or green LED. The output signal for the selected signal connection is either opened or closed .

2996 PDA detector troubleshooting

The 2996 PDA detector runs a series of internal diagnostics on start up. The indicator LEDs on the front of the detector and messages at the console show the results of the startup diagnostics. Refer to the table to troubleshoot problems encountered during startup diagnostics and during detector operation.

2996 PDA detector troubleshooting:

Symptom	Possible cause	Corrective action
Both LEDs unlit	No power	1. Inspect line cord connections. 2. Test electrical outlet for power.
	Open (spent) or defective fuse	Replace fuse.

2996 PDA detector troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Change in reference spectrum	Mobile phase contains gas or is contaminated	Prepare fresh mobile phase and degas thoroughly.
	Air bubbles trapped in flow cell	Reseat and check alignment of flow cell.
		Flush the flow cell, or apply slight backpressure on the detector waste outlet.
		Ensure the backpressure regulator is connected to the detector waste outlet.

2996 PDA detector troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Detector not responding to console	Detector not connected to IEEE to Ethernet converter	Inspect IEEE cable connections, tighten connectors.
	Incorrect IEEE address	1. Ensure that the detector IEEE address is unique and within the range 2 to 29 (see the *Empower System Installation and Configuration Guide*). 2. Rescan the acquisition server properties. For details, see *Empower Help*.
Shutter failure message	Shutter failed	Run the Shutter diagnostic. For details, see *Empower Help*.

2996 PDA detector troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Solvent in drain line	Leak from flow cell gasket	Replace the flow cell.
	Leak from flow cell fittings	Check fittings for over-tightening or undertightening, and replace fittings if necessary.
Status light blinks and lamp light is off	The detector is running confidence tests.	No corrective action required.

2996 PDA detector troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Status light blinks and lamp light on	Failed startup diagnostics	Reseat and check alignment of flow cell.
		Flush the flow cell.
	Insufficient energy reaching photodiode array because of air bubble, or dirty flow cell can cause shutter diagnostic to fail	Flush the flow cell.
		To prevent air bubbles from forming, check that there is a 1- to 2-foot (30- to 60-cm) length of 0.009-inch (0.23-mm) ID tubing connected to the detector waste outlet.
	Weak lamp	Replace lamp.

Chromatography troubleshooting

Warning: To prevent injury, always observe good laboratory practices when you handle solvents, change tubing, or operate the ACQUITY UPLC system. Know the physical and chemical properties of the solvents you use. Refer to the Material Safety Data Sheets for the solvents in use.

The table below lists chromatographic symptoms, possible causes, and suggested corrective actions for the ACQUITY UPLC system.

Before you use the table, read the General Troubleshooting section, and follow the basic troubleshooting steps to isolate the cause of the chromatographic symptom.

Chromatography troubleshooting:

Symptom	Possible cause	Corrective action
Erratic retention times	Air bubble in pump head	Prime binary solvent manager.
	Malfunctioning check valves	Clean or replace inlet check valve cartridges.
	Leaking plunger seals	Replace seals.
	Separation chemistry	Determine the suitability of mobile phase and column.
	Clogged solvent filters	Replace filters.
	Equilibration time after a gradient may be insufficient.	Use the column manager.

Chromatography troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Increased retention times	Incorrect flow rate	Change flow rate.
	Incorrect solvent composition	Change solvent composition.
	Incorrect mobile phase	Use correct mobile phase.
	Column contaminated	Clean or replace column.
	Incorrect column	Use correct column.
	Fluid leak (causes lower flow rate)	Inspect fittings for leaks. Perform leak test.

Chromatography troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Decreased retention times	Incorrect flow rate	Change flow rate.
	Incorrect solvent composition	Change composition.
	High column temperature	Reduce column temperature.
	Incorrect mobile phase	Use correct mobile phase.
	Column contaminated	Clean or replace column.
	Incorrect column	Use correct column.
	Sample diluent may be stronger than the initial mobile phase.	Dilute sample in a weaker solution. Inject less.
Reproducibility errors	Incorrect chemistry/ integration	Review chemistry and integration.
	Sample management system problem	Troubleshoot sample management system.

Chromatography troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Baseline drift, rapid	Column not equilibrated	Equilibrate column.
	Detector not allowed to warm up	Allow detector to warm up until baseline is stable. Time varies with wavelength and sensitivity.
	Solvent contaminated	Use fresh solvent.
	Flow fluctuations (rapid or slow drift)	Prime pump, replace pump seals, check valves (see “Erratic retention times” symptom earlier in this table).
	Incorrect wavelength for solvent	Ensure solvent does not absorb at the wavelength used.

Chromatography troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Baseline drift, slow	Solvent contaminated	Use fresh solvent.
	Decreased UV lamp energy	Determine lamp energy at the console.
	Ambient temperature fluctuations	Stabilize operating environment temperature enough to allow full equilibration.
	UV detector flow cell leaking (internal, cross-port)	Inspect flow cell, tighten connections.
	Dirty flow cell	Clean flow cell.
	Absorbance of A and B mobile phases are different due to spectral differences in the additives in water and organic solvents.	Balance the absorbance of the two mobile phases by reducing the concentration of the additive in the higher absorbing mobile phase. **Caution:** This makes the mobile phases slightly different with respect to the additive.

Chromatography troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Baseline noise cycling, short term (30 to 60 seconds)	Flow fluctuating	Look for leaks (see “Erratic retention times” symptom, earlier in this table).
	Radio frequency noise (short- or long-term cycling)	Eliminate interference.
Baseline noise cycling, long-term (approxi-mately 10 minutes to 1 hour)	Ambient temperature fluctuations	Stabilize ambient temperature.

Chromatography troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Baseline noise, random	Air in detector	Purge detector to remove air.
	Bubble detected	Reprime the solvent management system. Remove and vacuum filter solvents.
	Solvents contaminated	Use fresh solvent.
	Column contaminated	Clean or replace column.
	Dirty flow cell	Clean flow cell.
	System improperly grounded	Plug into outlet on different electrical circuit.
		Use power conditioner.
	Unit not cooling properly	Operate unit with covers in place. Check back panel for proper clearance.
	Radio frequency noise	Eliminate interference.
	Defective detector	Troubleshoot detector.
	The mobile phase might absorb too much at the wavelengths selected.	Do not monitor at such low wavelengths.
		Lower the concentration of the additive.
		Use a different additive or solvent with less absorbance and the chosen wavelength.

Chromatography troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Flat baseline, no peaks	No solvent flow	Determine flow rate.
	Detector lamp not on	Use detector diagnostics to determine reference/sample energy. Zero energy indicates lamp not on.
		Power-on lamp. If this does not resolve the problem, replace the lamp.
	Detector not zeroed	Zero the detector baseline.
	Incorrect detector wavelength	Check wavelength setting.
	Leak in solvent path	Check fittings.
	The mobile phase might absorb too much UV at the wavelengths selected.	Do not monitor at such low wavelengths.
		Lower the concentration of the additive.
		Use a different additive or solvent, one with less absorbance at the chosen wavelength.
		Refer to Appendix D in the *Waters ACQUITY UPLC System Operator's Guide.*

Chromatography troubleshooting: (Continued)

Symptom	Possible cause	Corrective action
Flat-topped peaks	Sample concentration or injection volume exceeds voltage output of detector	Decrease sample concentration or injection volume.
Sensitivity loss	Leak in binary solvent manager	Troubleshoot sample management system.
	Degraded, contaminated, or improperly prepared sample	Use fresh sample.
	Column contaminated	Clean or replace column.
	Loss of column efficiency	Clean or replace column.